IN THE CLAIMS:

Please cancel claims 11, 35 and 36 without prejudice. Kindly amend claims 18, 28 and 39 as follows. The present listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Twice Amended) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant [portion of the incident light beam emitted from the light source]interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a [fixed]first reflective grating assembly and a [mobile]second reflective grating assembly[,];

wherein the [mobile]first grating assembly is mobile along a given displacement relative to the [fixed]second grating assembly[;], wherein the [fixed reflective grating assembly and the mobile reflective grating assembly diffract]first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby [producing interference and the resultant

portion of the incident light beam detected by the at least one light detector]forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction, and wherein the resultant interference beam is directed at a resultant angle in a plane perpendicular to lines along which the first grating assembly and the second grating assembly are formed, the resultant angle having a value substantially equal to an angle of incidence in this perpendicular plane of the incident light beam multiplied by <<-1>> relative to an axis perpendicular to the first grating assembly and the second grating assembly, said at least one detector being arranged such that light beams interfering along the resultant-angle are measured by the at least one detector for determining a relative displacement.

2. (Amended) A device according to claim 1, wherein the [fixed]first grating assembly comprises a first reflective grating and the [mobile]second grating assembly comprises a second reflective grating.

3. (Amended) A device according to claim 1, wherein the [fixed]first grating assembly comprises a first reflective grating and a fourth reflective grating and the [mobile]second grating assembly comprises a second reflective grating and a third reflective grating, wherein the first grating and the fourth grating are of a first spatial period and are located substantially in a first plane, and the second grating and the third

grating are of a second spatial period and are located substantially in a second plane, wherein the first plane is displaced from the second plane.

4. (Amended) A device according to claim 1, wherein the [fixed]first grating assembly is mobile relative to the incident light beam, and the [mobile]second grating assembly is fixed relative to the incident light beam and is arranged between the light source and the at least one light detector.

5. (Amended) A device according to claim 4, wherein the [mobile]second grating assembly, the source, and the at least one detector form an integrated measuring head and the [fixed]first grating assembly further comprises a first reflective grating that defines a scale for the device.

6. (Amended) A device according to claim 5, wherein the detector is integrated in a semiconductor substrate bearing the [mobile]second grating assembly.

7. (Amended) A device according to claim 5, wherein the light source is integrated in a semiconductor substrate bearing the [mobile]second grating assembly.

8. (Amended) A device according to claim 1, wherein the [fixed]first grating assembly has a first spatial period and the [mobile]second grating assembly has a second spatial period that is half the first spatial period of the [fixed]first grating assembly.

9. (Amended) A device according to claim 4, wherein the [fixed]first grating assembly has a first spatial period and the [mobile]second grating assembly has a second spatial period that is half the first spatial period of the [fixed]first grating assembly.

10. (Canceled)

11. (Canceled)

12. (Twice Amended) A device according to claim 1[10], wherein the incident light beam enters the [fixed]first grating assembly at the angle of incidence which is not zero in the plane perpendicular to the lines along which the [fixed]first grating assembly and the [mobile]second grating assembly are formed, the angle of incidence being sufficient so that the light source and a detection region of the at least one detector are spatially separated from each other in projection in the perpendicular plane[perpendicular to the lines along which the fixed grating assembly and the mobile grating assembly are formed].

13. (Amended) A device according to claim 1, wherein the [fixed]first grating assembly comprises a dielectric layer of index n greater than 1.8.

14. (Amended) A device according to claim 1, wherein the [mobile]second grating assembly comprises a dielectric layer on top of a reflective substrate.

15. (Not Amended) A device according to claim 2, wherein the first grating and the second grating are formed of several longitudinal secondary gratings of close but different frequencies thereby allowing an absolute displacement measurement over at least one range of measurement.

16. (Not amended) A device according to claim 3, wherein the first grating, the second grating, the third grating and the fourth grating are formed of several longitudinal secondary gratings of close but different frequencies thereby allowing an absolute displacement measurement over at least one range of measurement.

17. (Amended) A device according to claim 1, further comprising at least one diffraction grating arranged beside at least one of the [fixed]first grating assembly and the [mobile]second grating assembly so as to define at least one reference position for the at least one detector.

18. (Amended) A device according to claim [1]17, [further comprising]wherein said at least one diffraction grating [having]has at least one offset or phase jump incorporated with the lines of the at least one diffraction grating so as to define at least one reference position for the at least one detector.

19. (Amended) A device according to claim 1, wherein the at least one detector

is arranged for measuring a relative velocity between the [fixed]first grating assembly and the [mobile]second grating assembly, wherein a sole measurement of a frequency of detected luminous intensity modulation provides the relative velocity.

20. (Not amended) A device according to claim 2, wherein at least one of the first grating and the second grating has a region with lines offset or phase shifted relative to lines of an other region.

21. (Not amended) A device according to claim 3, wherein at least one of the first grating, the second grating, the third grating and the fourth grating has a region with lines offset or phase shifted relative to lines of an other region.

22. (Amended) A device according to claim 2, wherein at least one of the first grating and the second grating has a region formed of at least two secondary gratings having a same period and a same phase shifted or off set lines, the phase shifted or off set lines being provided so that the resultant [portion of the incident light]interference beam comprises two distinct beams that interfere and produce alternating luminous intensity signals varying as a function of relative position between the [fixed]first grating assembly and the [mobile]second grating assembly, whereby the alternating luminous intensity signals permits interpolation in an electric period of the luminous intensity signals and allows detection of a relative displacement direction between the [fixed]first grating assembly and the [mobile]second grating assembly.

23. (Amended) A device according to claim 3, wherein at least one of the first grating, the second grating, the third grating and the fourth grating has a region formed of at least two secondary gratings having a same period and a same phase shifted or off set lines, the phase shifted or off set lines being provided so that the resultant [portion of the incident light]interference beam comprises two distinct beams that interfere and produce alternating luminous intensity signals varying as a function of relative position between the [fixed]first grating assembly and the [mobile]second grating assembly, whereby the alternating luminous intensity signals permits interpolation in an electric period of the luminous intensity signals and allows detection of a relative displacement direction between the [fixed]first grating assembly and the [mobile]second grating assembly.

24. (Not amended) The device according to claim 5, wherein the light source comprises an electroluminescent diode.

25. (Not amended) The device according to claim 24, further comprising an optical collimation element arranged between the light source and the first grating.

26. (Twice Amended) A device according to claim 2, wherein the light source emits the incident light beam so that the incident light beam comprises a first partial beam incident upon the [fixed]first grating assembly at a positive angle of incidence and a second partial beam incident upon the [fixed]first grating assembly at a negative angle of

incidence, the [fixed]first grating assembly and the [mobile]second grating assembly being arranged on either side of two regions of incidence respectively defined by the first partial beam and the second partial beam incident upon the [fixed]first grating assembly so as to form first to fourth diffracted beams and then to generate at least two resultant interference beams which are[between the fourth diffracted beam and a fifth diffracted beam, thereby producing light] detected on either side of the two regions by at least two light detectors arranged on either side of the two regions of incidence.

27. (Twice Amended) A device according to claim 8, wherein the light source emits the incident light beam so that the incident light beam comprises a first partial beam incident upon the [fixed]first grating assembly at a positive angle of incidence and a second partial beam incident upon the [fixed]first grating assembly at a negative angle of incidence, the [fixed]first grating assembly and the [mobile]second grating assembly being arranged on either side of two regions of incidence respectively defined by the first partial beam and the second partial beam incident upon the [fixed]first grating assembly so as to form first to fourth diffracted beams and then to generate at least two resultant interference beams which are[between the fourth diffracted beam and a fifth diffracted beam, thereby producing light] detected on either side of the two regions by at least two light detectors arranged on either side of the two regions of incidence.

28. (Three Times Amended) A device according to claim [26]40, wherein the source is attached to the [mobile]second grating assembly so that a portion of the

[mobile]second grating assembly is situated on either side of the source and offset or phase shifted relative to each other portion so that alternating light signals resulting from interference as detected by the at least two detectors are phase shifted by $\Lambda/2$, wherein Λ is a spatial period.

29. (Amended) A device according to claim [26]40, further comprising a fifth diffraction grating arranged between the source and the first grating.

30. (Twice Amended) A device according to claim [26]40, wherein the source provides a substantially collimated beam propagating along a direction substantially perpendicular to the first grating.

31. (Not amended) A device according to claim 2, wherein at least one of the first grating or the second grating defines a bi-directional diffraction grating having a same spatial period along two orthogonal axes.

32. (Amended) A device according to claim 2, further comprising at least first and second reflective surfaces, the first reflective surface arranged to deviate a first beam originating from the source and propagating substantially along a displacement direction [in the direction of the first]of the second reflective grating in order to provide the incident beam, and the second reflective surface arranged to reflect the interfering light along [an]the output direction substantially in a direction parallel to the displacement direction

before being detected by the at least one detector.

33. (Twice Amended) A device according to claim [32]43, wherein the source and the at least one detector are attached to the [fixed]first grating assembly and the first and second reflective surfaces are formed on a rod supporting the [mobile]second grating assembly.

34. (Previously Presented) A device according to claim 6, wherein the light source is integrated in a semiconductor substrate bearing the second grating assembly.

35. (Canceled)

36. (Canceled)

37. (Previously Presented) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a first reflective grating assembly having a first reflective grating and a second reflective grating assembly having a second reflective grating;

wherein the first grating assembly is mobile along a given displacement relative to

the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction, wherein the first grating and the second grating are formed of several longitudinal secondary gratings of close but different frequencies thereby allowing an absolute displacement measurement over at least one range of measurement.

38. (Previously Presented) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a first reflective grating assembly and a second reflective grating assembly; and

at least one diffraction grating arranged beside at least one of the first grating assembly and the second grating assembly so as to define at least one reference position for the at least one detector;

wherein the first grating assembly is mobile along a given displacement relative to the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction.

39. (Amended) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a first reflective grating assembly and a second reflective grating assembly; and

at least one diffraction grating arranged beside at least one of the first grating assembly and the second grating assembly, said at least one diffraction grating having at least one offset or phase jump incorporated with the lines of the at least one diffraction grating so as to define at least one reference position for the at least one detector;

wherein the first grating assembly is mobile along a given displacement relative to

the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction.

40. (Previously Presented) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a first reflective grating assembly having a first reflective grating and a second reflective grating assembly having a second reflective grating;

wherein the first grating assembly is mobile along a given displacement relative to the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by

the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction, wherein the light source emits the incident light beam so the incident light beam comprises a first partial beam incident upon the fixed grating assembly at a positive angle of incidence and a second partial beam incident upon the fixed grating assembly at a negative angle of incidence, the first grating assembly and the second grating assembly being arranged on either side of two regions of incidence respectively defined by the first partial beam and the second partial beam incident upon the first grating assembly so as to form first to fourth diffracted beams and then to generate at least two resultant interference beams which are detected on either side of the two regions by at least two light detectors arranged on either side of the two regions of incidence.

41. (Previously Presented) A device according to claim 40, wherein the first grating assembly has a first spatial period and the second grating assembly has a second spatial period that is half the first spatial period of the first grating assembly.

42. (Previously Presented) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly

comprising a first reflective grating assembly having a first reflective grating and a second reflective grating assembly having a second reflective grating, wherein at least one of the first grating or the second grating defines a bi-directional diffraction grating having a same spatial period along two orthogonal axes;

wherein the first grating assembly is mobile along a given displacement relative to the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction.

43. (Previously Presented) A device utilizing light diffraction for measuring translation, rotation or velocity, the device comprising:

a light source emitting an incident light beam;

at least one light detector for detecting a resultant interference beam;

a diffraction grating assembly located on a light path of the incident light beam between the light source and the at least one light detector, the diffraction grating assembly comprising a first reflective grating assembly having a first reflective grating and a second reflective grating assembly having a second reflective grating; and

at least first and second reflective surfaces, the first reflective surface arranged to

deviate a first beam originating from the source and propagating substantially along a displacement direction of the second reflective grating in order to provide the incident beam, and the second reflective surface arranged to reflect interfering light along the output direction substantially in a direction parallel to the displacement direction before being detected by the at least one detector;

wherein the first grating assembly is mobile along a given displacement relative to the second grating assembly, wherein the first and second grating assemblies are arranged to diffract at least a portion of the incident light beam, the incident light beam reaching the first grating assembly where the incident light beam is partially diffracted along two different directions thereby forming two partial light beams which reach the second grating assembly, and, thereafter, the first grating assembly, thereby forming, after diffraction by the first grating assembly, the resultant interference beam resulting from interference of the two partial light beams along an output direction.